

Metals Affordability Initiative Core Program (MAI-Core)
Statement of Work (SOW) for F33615-99-2-5215

1.0 Objective

MAI's main objective is the implementation of revolutionary technologies and process improvements to the metals industry to reduce acquisition and life cycle costs of aerospace components by fifty (50%) percent. Furthermore, MAI will strive to deliver a supplier base which can provide critical turbine engine, airframe, and space components which cost significantly less than current components and with lead times much more responsive to U.S. military and commercial aerospace industry requirements. These objectives will be accomplished mainly by improving manufacturing processes, through the application of modeling and simulation of products and processes, and by integrating design and manufacturing activities. Improvements will be measured through component demonstrations, using parts that are already in production, or in the Engineering & Manufacturing Development (EMD) phase.

2.0 Scope

Cost and payoff studies are essential for each project undertaken by MAI. Assessment of cost and the benefits of implementation of new technologies and processes will be conducted within the Activity Integrated Product Teams (AIPT'S). The principal evaluator of cost will be the supplier who will work individually with the OEM's to determine the cost benefit analysis of the project and the project results. Data gathered from one OEM will not be shared with other OEM's.

In conjunction with the USAF and industry partners identifying their business mission and goals, the Technical Oversight Committee (TOC) will begin its technology selection process designed to support the MAI strategic direction.

The MAI team has adopted as part of its proposed Statement of Work (SOW) and its Program Operating Procedures (POP) a Task/Gate process to maximize progress and allow go/no-go decisions. This is a risk-minimization plan that is based on sound business decision-making methods used by industry that make significant investments in technology. The MAI has structured all projects in a Task-Gate process in which the selection, development, and implementation process is divided into separate tasks. A step-wise progression of development and gate reviews will be performed at critical points to assess plan progress, test the proposed economics, and approve continuation of activity into the next task. This process is schematically summarized in Figure 2 below. There are five gates from Task 1 (concept) to Task 6 (full production). The Gate reviews are designed to allow the process owners, customers, and Technical Oversight Committee (TOC) members to assess the technical progress and economic benefit of a project. The Gates are the primary cost control mechanism for the management of each project.

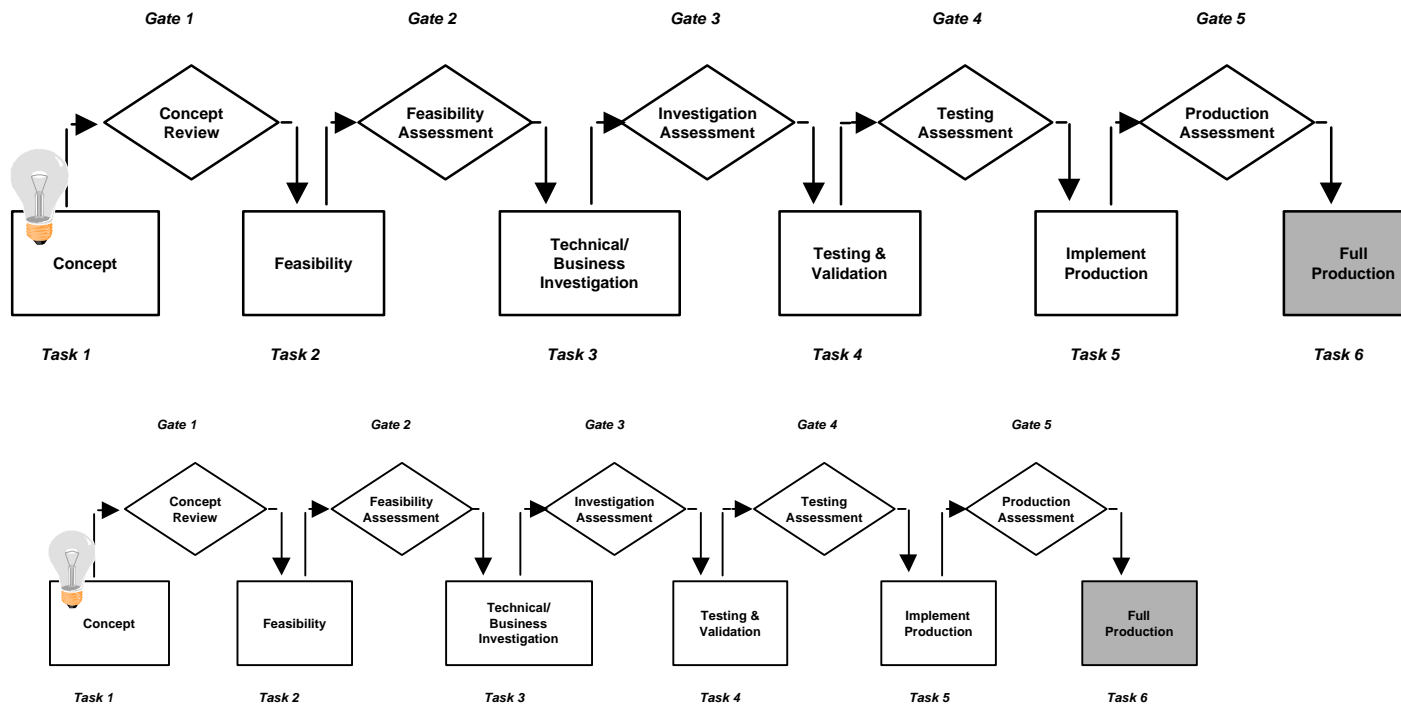


Figure 2. Schematic of the MAI Proposed Task-Gate Process

Should a gate assessment determine that insufficient progress has been achieved during a prior task of a Project, or that obstacles related to technical, supplier, or efficiency issues cannot be overcome, then a no-go decision will be made and the project will be terminated. The TOC will then determine the most effective re-distribution of resources originally allocated for future activities on the now terminated project. The TOC can elect to apply the remaining resources to an ongoing project on the MAI program that is related to a different technology. This will be recommended if there is a strong return on investment opportunity for a technology, but a shortfall in the resources necessary to achieve full implementation has been identified. The TOC will also have the option of initiating a new project activity related to a technology not previously addressed under the MAI program, provided that the TOC project selection process identifies a strong need for this technology. With either approach, the required cost sharing must be identified and committed by the proposed participants for the ongoing or new project activity. Once the TOC has identified the recommended re-allocation of funds, and the expanded ongoing or new technical project has been planned, an MAI contract revision will be prepared and submitted to the funding agency to achieve approval for the appropriate work statement changes.

3.0 Phase I

The first phase in the technology selection process is the "Task 1" "Gate 1", "Task 2" and "Gate 2" activities which respectively relate to "Concept Identification", "Concept Review", "Feasibility Investigation", and "Feasibility Assessments" activities. These activities are designed to bring forth technical ideas through the metals industry while ensuring that these ideas are consistent with the overall MAI goal and plans. In the early reviews and tasks of technology

identification, the TOC will assist the Executive Steering Committee (ESC) by communicating the MAI strategic focus and by establishing the technical direction needed to fulfill the consortium's strategy.

3.1 Phase I, Task 1 - Concept Identification Activities:

3.1.1. Introduction: Concept Identification

The Task 1 activities consist of the basic work needed to gain a high-level understanding of the concept being considered by the TOC. The Task 1 activities consist of the initial identification of concept validity; be it a new component, material, manufacturing/engineering process, or systems idea as is identified by the team member or subcontractor.

Once the idea "champion" identifies the concept, they must conduct the basic customer interest, market "pull", and technical applicability research needed to understand the idea. The concept should then be formulated and presented in a manner such that the TOC is consulted on the concept's merits. Items to be considered, at a very high level, by the concept champion should consist of:

- Is there an industry/market demand for the concept
- What are the industry issues effecting the concept such as technical feasibility and financial merit
- What are the internal issues effecting the concept such as alignment with investment strategy, compatibility with existing facilities and impact on other products

3.1.2 Gate I - Concept Review Activities:

Introduction: Initial Concept Review Gate

The Gate I review is the first screening of the technology concept. Here, the TOC makes the first decision to investigate the concept. This review signals a preliminary, yet tentative, commitment to the project. At this gate, the concept champion is given the resources to conduct an initial feasibility investigation (Task 2).

3.2 Task 2 - Feasibility Investigation:

3.2.1 Introduction: Feasibility Investigation Task

Once a concept has been approved through the first gate by the ESC, the next step is to understand the feasibility of the proposed project. This task is used to inexpensively determine the project's technical, market-place and financial merits. Here, the TOC provides the AIPT with the resources to "scope" the project; i.e., understand the project's benefits and define the external and the internal customer. In this task, a preliminary financial, technical, systems and market assessment is conducted. Preliminary feasibility is established.

3.2.2 Gate 2 - Feasibility Review Activities:

Introduction: Feasibility Assessment Gate

During this gate, the project is subjected to a second and more rigorous screening. The project is evaluated in light of the activities done during Task 2. At Gate 2, the project is subjected to the same criteria as Gate 1; however, more criteria are added to the original set. During this gate "go/no go/pause/rework" criteria are reviewed with more rigor. These criteria can include: technical feasibility issues, time-to-technology readiness assessments, strategic fit considerations, and cost/benefits issues.

The Gate 2 activities consist of a TOC review of the validity of the suggested technology project. Once the merits of a project have been studied and assessed, the TOC must evaluate the concept. As in the activities surrounding the concept identification stage, this review is a preliminary/high-level assessment of the project's merits.

To prepare for such a review the following areas with regards to the merits of the technology project must be understood:

1. Overall project attractiveness:

- Alignment with MAI goals/objectives
- Financial, technical, time-to-readiness attractiveness
- Manufacturability
- Competitive/market attractiveness
- Customer need

2. Specific technology "delivery" plans:

- Identification of key milestones
- Identification of key manpower issues/needs
- Identification of key financial needs

3. Concept metrics:

- Identification of key technical measurements
- Identification of key financial measurements
- Identification of key strategic measurements

4.0 Phase II

Once a technology concept has been deemed feasible by TOC and approved by the ESC as a "Selected Project", the responsible AIPT will continue the management of the project utilizing the Task-Gate system.

At each task activity, the AIPT will be responsible for the day-to-day operation and progress of the technology project. The TOC will be responsible for overall management of all the

technology projects to ensure that they are all consistent with the MAI strategic focus. The TOC will also monitor the progress of all projects as they pass through the various Gate reviews and provide funding and expertise when needed.

4.1 Task 3 - Technical & Business Investigation:

4.1.1 Introduction: Technical & Business Investigation

During this task, the true business and technical case for the project is constructed. Here, the project leader will identify the key elements of a successful technology and technology delivery plan. This effort may vary from fairly fundamental applied research to sophisticated breadboard hardware, studying programming and planning efforts. Also, as more detailed information is generated, an updated systems level assessment is performed to coincide with an appropriate demonstration.

During this task, detailed investigations are carried out to verify the project's attractiveness on a strategic, financial, technical, time-to-production, risk, resource allocation and customer needs basis.

4.1.2 Gate 3 - Investigation Assessment:

Introduction: Investigation Assessment Gate

Typically, this will be the final gate prior to a significant funding commitment. This gate review is designed to assess the project's viability moving into the testing & validation stage. If the TOC is satisfied with the feasibility of the technical merits and financial attractiveness, the project will be given the approval to conduct various testing and prototyping activities.

4.2 Task 4 - Testing & Validation:

4.2.1 Introduction: Testing and Validation Task

During this task, product readiness of a project is developed, tested and validated. In this task the transition from development to production floor is initiated. Here demonstration of the concept in a complete and integrated system is conducted. In general, the product/process, customer acceptance, financial attractiveness, and various risks (time-to-production, resources, technical, etc.) of the project are finalized.

4.2.2 Gate 4 - Testing & Validation Assessment:

Introduction: Testing and Validation Assessment Gate

This gate is the point where the project's technology readiness and the adequacy of the testing/validation stage are decided. This is a key decision point to proceed to implementation

and production. In addition to the technical and financial considerations, key aspects of the project will be reviewed with special attention paid to ease of delivery to manufacturing.

4.3 Task 5 – Plan to Implement Production Process and Final Report:

4.3.1 Introduction: Implement Production Process Task

During this task, the financial benefits, implementation production concerns, sourcing issues, etc. are finalized. Work is conducted to assess project readiness for implementation in a manufacturing setting. Submit plan to implement technology aligned with appropriate engine or airframe milestone.

4.3.2 Gate 5 - Approval of Production Process:

Introduction: Customer Approval of Production Process Gate

This gate is an assessment of, and decision by the implementing company on, the project's viability in a manufacturing setting. In addition to the technical and financial considerations, key aspects of the project will be reviewed focusing on its likelihood of success in a production environment.

4.3.3 Final Report - Delivery & Feedback:

Introduction: Delivery & Feedback

This marks the completion of the technology program. Included in this report, the "lessons learned", sponsor satisfaction, and technology knowledge/ownership transfer issues are documented.

4.3.4 Task 6 – Management and Reporting:

The overall management and logistics coordination of the tasks will be conducted by P&W, through the MAI Program Office, as defined in the Program Operating Plan (POP). In this role, P&W will ensure that all contractual obligations defined in the TIA are fulfilled, reports are prepared and disseminated to all MAI members and to the government at the prescribed intervals, and that all bills and invoices are properly processed and distributed, etc. A final report will be prepared to mark the completion of the technology program. Included in this report will be, as a minimum, all technical conclusions and data obtained from all project work, as well as the “lessons learned”, sponsor satisfaction, and technology knowledge/ownership transfer issues.

Reports, reporting procedures, delivery, etc, will be conducted per the provisions of the Core MAI TIA. All data will be reported in metric (SI) units with appropriate common use English units in parentheses.

4.3.5 Special Considerations.

Each AIPT will assess the health and safety consequences of the technology being developed from the standpoint of the project itself. If the new technology turns out to have adverse health and safety consequences, each AIPT will provide suggestions for making the technology health and safety acceptable and indicate what impact the suggestions will have on the technology from an economic standpoint.

